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PTO/SB/08a (08-03)

Approved for use through 07/31/2008. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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Substitute for form 1449A/PTO

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet

1

of

4

Application Number

10/032,284

Filing Date

December 21, 2001

First Named Inventor

Ling Chen, et al.

Group Art Unit

1763

Examiner Name

Moore, Karla A.

Attorney Docket Number

AMAT/5192.02/CPI/COPPER/PJS

Submission Date

February 17, 2004

## U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
ku	A1	US-6660126 B2	12/09/2003	Nguyen, et al.	
	A2	US-6630030 B1	10/07/2003	Suntola, et al.	
	A3	US-6579372 B2	06/17/2003	Park	
	A4	US-6578287 B2	06/17/2003	Aswad	
	A5	US-6572705 B1	06/03/2003	Suntola, et al.	
	A6	US-6551406 B2	04/22/2003	Kilpi	
	A7	US-6511539 B1	01/28/2003	Raaijmakers	
	A8	US-6481945 B1	11/19/2003	Hasper, et al.	
	A9	US-6478872 B1	11/12/2002	Chae, et al.	
	A10	US-6447607 B2	09/10/2002	Soininen, et al.	
	A11	US-6231672 B1	05/15/2001	Choi, et al.	
	A12	US-6197683 B1	03/06/2001	Kang, et al.	
	A13	US-6183563 B1	02/06/2001	Choi, et al.	
	A14	US-5338362	08/16/1994	Imahashi	
	A15	US-5261959	11/16/1993	Gasworth	
	A16	US-20040015300 A1	01/22/2004	Ganguli, et al.	
	A17	US-20040013577 A1	01/22/2004	Ganguli, et al.	
	A18	US-20040011504 A1	01/22/2004	Ku, et al.	

## FOREIGN PATENT DOCUMENTS

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		Number-Kind Code <sup>2</sup> (if known)				
ku	B1	WO 02/45871 A1	06/13/2002	Angstrom Systems, Inc.		
	B2	WO 02/08488 A1	01/31/2002	ASM Microchemistry OY		
	B3	WO 01/36702 A1	05/25/2001	Genitech Co., Ltd.		
	B4	WO 01/17691 A1	03/15/2001	ASM America, Inc.		
	B5	WO 00/79576 A1	12/28/2000	Genitech, Inc.		

Examiner

KARLA MOORE

Date Considered

3/9/05

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Sheet 2

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Application Number

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December 21, 2001

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		Number-Kind Code <sup>2</sup> (if known)			
Ku ↓	A1	US-20040011404 A1	01/22/2004	Ku, et al.	
	A2	US-20030224107 A1	01/29/1991	Hey et al.	
	A3	US-20030213560 A1	11/20/2003	Wang, et al.	
	A4	US-20030198754 A1	10/23/2003	Xi, et al.	
	A5	US-20030194493 A1	10/16/2003	Chang, et al.	
	A6	US-20030143747 A1	07/31/2003	Bondestam, et al.	
	A7	US-20030140854 A1	07/31/2003	Kilpi	
	A8	US-20030121608 A1	07/03/2003	Chen, et al.	
	A9	US-20030121469 A1	07/03/2003	Lindfors, et al.	
	A10	US-20030116087 A1	06/26/2003	Nguyen, et al.	
	A11	US-20030113187 A1	06/19/2003	Lei, et al.	
	A12	US-20030106490 A1	06/12/2003	Jallepally, et al.	
	A13	US-20030101927 A1	06/05/2003	Raaijmakers	
	A14	US-20030089308 A1	05/15/2003	Raaijmakers	
	A15	US-20030079686 A1	05/01/2003	Chen, et al.	
	A16	US-20030075925 A1	04/24/2003	Lindfors, et al.	
	A17	US-20030075273 A1	04/24/2003	Kilpela, et al.	
	↓	A18	US-20030053799 A1	03/20/2003	

### FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document Number-Kind Code <sup>2</sup> (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T <sup>6</sup>
Ku	B1	WO 00/54320	09/14/2000	Genus, Inc.		
	B2	WO 99/65064	12/16/1999	A.S.M. International N.V.		
	B3	WO 99/01595	01/14/1999	Neste OY		
	B4	WO 96/17107	06/06/1996	Milrokemia OY		
	B5	JP 2000-212752	08/02/2000			

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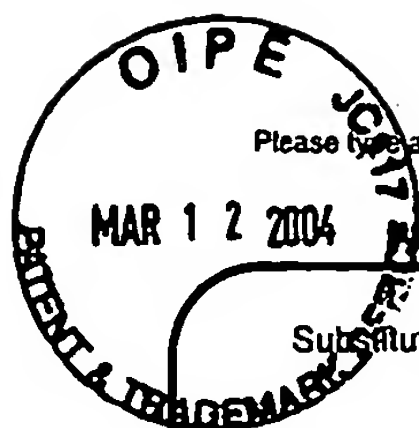
KARLA MOORE

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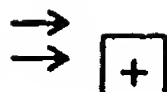
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Sheet 3

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Application Number

10/032,284

Filing Date

December 21, 2001

First Named Inventor

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		Number-Kind Code <sup>2</sup> (if known)			
✓	A1	US-20030042630 A1	03/06/2003	Babcoke, et al.	
	A2	US-20030023338 A1	01/30/2003	Chin, et al.	
	A3	US-20030010451 A1	01/16/2003	Tzu, et al.	
	A4	US-20030004723 A1	01/02/2003	Chihara	
	A5	US-20020146511 A1	10/10/2002	Chiang, et al.	
	A6	US-20020144657 A1	10/10/2002	Chiang, et al.	
	A7	US-20020144655 A1	10/10/2002	Chiang, et al.	
	A8	US-20020134307 A1	09/26/2002	Choi	
	A9	US-20020121342 A1	09/05/2002	Nguyen, et al.	
	A10	US-20020121241 A1	09/05/2002	Nguyen, et al.	
	A11	US-20020108570 A1	08/15/2002	Lindfors	
	A12	US-20020104481 A1	08/08/2002	Chiang, et al.	
	A13	US-20020094689 A1	07/18/2002	Park	
	A14	US-20020092471 A1	07/18/2002	Kang, et al.	
	A15	US-20020086106 A1	07/04/2002	Park, et al.	
	A16	US-20020076508 A1	06/20/2002	Chiang, et al.	
	A17	US-20020076507 A1	06/20/2002	Chiang, et al.	
✓	A18	US-20020076481 A1	06/20/2002	Chiang, et al.	

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		Number-Kind Code <sup>2</sup> (if known)				
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	B3					
	B4					
	B5					

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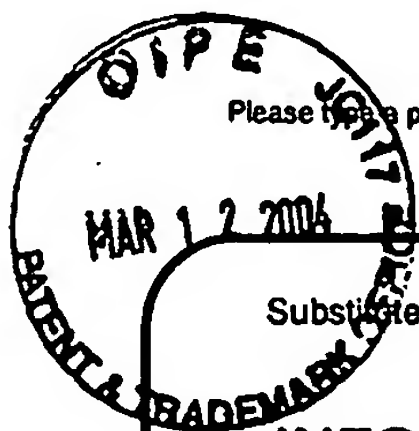
KARLA MOORE

Date Considered

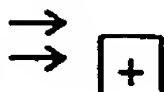
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Sheet 4

of 4

Application Number

10/032,284

Filing Date

December 21, 2001

First Named Inventor

Ling Chen, et al.

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ku	A1	US-20020073924 A1	06/20/2002	Chiang, et al.	
	A2	US-20020066411 A1	06/06/2002	Chiang, et al.	
	A3	US-20020052097 A1	05/02/2002	Park	
	A4	US-20020041931 A1	04/11/2002	Suntola, et al.	
	A5	US-20020007790 A1	01/24/2002	Park	
	A6	US-20020000196 A1	01/03/2002	Park	
	A7	US-20010054377 A1	12/27/2001	Lindfors, et al.	
	A8	US-20010042523 A1	11/22/2001	Kesala	
	A9	US-20010014371 A1	08/16/2001	Kilpi	
	A10	US-20010013312 A1	08/16/2001	Soininen, et al.	
	A11	US-			
	A12	US-			
	A13	US-			
	A14	US-			
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	A16	US-			
	A17	US-			
	A18	US-			

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KAPLA MOORE

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U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)					Docket No. AMAT/6222		Serial No. 10/032,284	
LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT					Applicant Chen, et al.			
(Use several sheets if necessary)					Filing Date December 21, 2001		Group Unknown	
Examiner Unknown								

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U.S. Patent Documents							
*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate
W	A1	4,058,430	11/15/77	Suntola et al.	156	611	11/25/1975
	A2	4,389,973	06/28/83	Suntola et al.	118	725	12/11/1981
	A3	4,413,022	11/01/83	Suntola et al.	427	255.2	06/21/1979
	A4	4,486,487	12/04/84	Skarp	428	216	04/25/1983
	A5	4,767,494	08/30/88	Kobayashi et al.	156	606	09/19/1986
	A6	4,806,321	02/21/89	Nishizawa et al.	422	245	07/21/1985
	A7	4,829,022	05/09/89	Kobayashi et al.	437	107	12/09/1986
	A8	4,834,831	05/30/89	Nishizawa et al.	156	611	09/04/1987
	A9	4,838,983	06/13/89	Schumaker et al.	156	613	03/18/1988
	A10	4,838,993	06/13/89	Aoki et al.	156	643	12/03/1987
	A11	4,840,921	06/20/89	Matsumoto	437	89	06/30/1988
	A12	4,845,049	07/04/89	Sunakawa	437	81	03/28/1988
✓	A13	4,859,625	08/22/89	Nishizawa et al.	437	81	11/20/1987


Foreign Patent Documents								
*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
W	B1	01/66832 A2	09/13/2001	WO	C30B	16/44	—	X
	B2	01/40541 A1	06/07/2001	WO	C23C	16/40	—	X
	B3	01/36702 A1	05/25/2001	WO	C23C	16/00	—	X
	B4	01/29893 A1	04/26/2001	WO	H01L	21/768	—	X
✓	B5	01/29891 A1	04/26/2001	WO	H01L	21/768	—	X

OTHER ART		
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
W	C1	Hultman, et al., "Review of the thermal and mechanical stability of TiN-based thin films", <i>Zeitschrift Fur Metallkunde</i> , 90(10) (Oct. 1999), pp. 803-813.
W	C2	Klaus, et al., "Atomic Layer Deposition of SiO <sub>2</sub> Using Catalyzed and Uncatalyzed Self-Limiting Surface Reactions", <i>Surface Review &amp; Letters</i> , 6(3&4) (1999), pp. 435-448.

Examiner	LAPLA MOORE	Date Considered	8/9/00
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Examiner Unknown								
U.S. Patent Documents								
*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date if Appropriate	
W	A14	4,859,627	08/22/89	Sunakawa	437	81	07/01/1988	
	A15	4,861,417	08/29/89	Mochizuki et al.	156	610	03/24/1988	
	A16	4,876,218	10/24/89	Pessa et al.	437	107	09/26/1988	
	A17	4,927,670	05/22/1990	Erbil	427	255.3	06/22/1988	
	A18	4,931,132	06/05/90	Aspnes et al.	156	601	10/07/1988	
	A19	4,960,720	10/02/90	Shimbo	437	105	08/24/1987	
	A20	4,975,252	12/04/90	Nishizawa et al.	422	245	05/26/1989	
	A21	4,993,357	02/19/91	Scholz	118	715	12/21/1989	
	A22	5,013,683	05/07/91	Petroff et al.	437	110	01/23/1989	
	A23	5,082,798	01/21/92	Arimoto	437	108	09/27/1990	
	A24	5,085,885	02/04/92	Foley et al.	477	38	09/10/1990	
	A25	5,091,320	02/25/92	Aspnes et al.	437	8	06/15/1990	
	A26	5,130,269	07/14/92	Kitahara et al.	437	111	04/25/1989	
✓	A27	5,166,092	11/24/92	Mochizuki et al.	437	105	10/30/1990	
Foreign Patent Documents								
*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
W	B6	01/29280 A1	04/26/2001	WO	C23C	16/32	—	X
	B7	01/27347 A1	04/19/2001	WO	C23C	16/44	—	X
	B8	01/27346 A1	04/19/2001	WO	C23C	16/44	—	X
✓	B9	01/15220 A1	03/01/2001	WO	H01L	21/768	—	X
OTHER ART								
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.						
W	C3	Yamaguchi, et al., "Atomic-layer chemical-vapor-deposition of silicon dioxide films with extremely low hydrogen content", <i>Appl. Surf. Sci.</i> , Vol. 130-132 (1998), pp. 202-207.						
W	C4	George, et al., "Surface Chemistry for Atomic Layer Growth", <i>J. Phys. Chem.</i> , Vol. 100 (1996), pp. 13121-131.						
Examiner <b>KAPLA MOORE</b>					Date Considered <b>5/9/05</b>			
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U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)					Docket No. AMAT/6222		Serial No. 10/032,284	
LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT					Applicant Chen, et al.			
(Use several sheets if necessary)					Filing Date December 21, 2001		Group Unknown	
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U.S. Patent Documents								
*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate	
W	A28	5,225,366	07/06/93	Yoder	437	108	06/22/1990	
	A29	5,246,536	09/21/93	Nishizawa et al.	156	610	03/10/1989	
	A30	5,250,148	10/05/93	Nishizawa et al.	156	611	11/12/1991	
	A31	5,254,207	10/19/93	Nishizawa et al.	156	601	11/30/1992	
	A32	5,256,244	10/26/93	Ackerman	156	613	02/10/1992	
	A33	5,270,247	12/14/93	Sakuma et al.	437	133	07/08/1992	
	A34	5,278,435	01/11/94	Van Hove et al.	257	184	06/08/1992	
	A35	5,281,274	01/25/94	Yoder	118	697	02/04/1993	
	A36	5,290,748	03/01/94	Knuuttila et al.	502	228	07/16/1992	
	A37	5,294,286	03/15/94	Nishizawa et al.	156	610	01/12/1993	
	A38	5,296,403	03/22/94	Nishizawa et al.	437	133	10/23/1992	
	A39	5,300,186	04/05/94	Kitahara et al.	156	613	04/07/1992	
✓	A40	5,311,055	05/10/94	Goodman et al.	257	593	11/22/1991	
Foreign Patent Documents								
*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
W	B10	00/79576 A1	12/28/2000	WO	H01L	21/205	—	X
	B11	00/79019 A1	12/28/2000	WO	C23C	16/00	—	X
✓	B12	00/63957 A1	10/26/2000	WO	H01L	21/205	—	X
OTHER ART								
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.						
W	C5	George, et al., "Atomic layer controlled deposition of SiO <sub>2</sub> and Al <sub>2</sub> O <sub>3</sub> using ABAB...binary reaction sequence chemistry", <i>Appl. Surf. Sci.</i> , Vol. 82/83 (1994), pp. 460-467.						
W	C6	Wise, et al., "Diethyldiethoxysilane as a new precursor for SiO <sub>2</sub> growth on silicon", <i>Mat. Res. Soc. Symp. Proc.</i> , Vol. 334 (1994), pp. 37-43.						
Examiner <b>KAPLA MOORE</b>					Date Considered <b>3/9/02</b>			
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U.S. Patent Documents								
*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate	
W	A41	5,316,615	05/31/94	Copel	117	95	03/09/1993	
	A42	5,316,793	05/31/94	Wallace et al.	427	248.1	07/27/1992	
	A43	5,330,610	07/19/94	Eres et al.	117	86	05/28/1993	
	A44	5,336,324	08/09/94	Stall et al.	118	719	12/04/1991	
	A45	5,338,389	08/16/94	Nishizawa et al.	117	89	04/21/1993	
	A46	5,348,911	09/20/94	Jurgensen et al.	117	91	04/26/1993	
	A47	5,374,570	12/20/94	Nasu et al.	437	40	08/19/1993	
	A48	5,395,791	03/07/95	Cheng et al.	437	105	10/20/1993	
	A49	5,438,952	08/08/1995	Otsuka	117	84	01/31/1994	
	A50	5,439,876	08/08/95	Graf et al.	505	447	08/16/1993	
	A51	5,441,703	08/15/95	Jurgensen	422	129	03/29/1994	
	A52	5,443,033	08/22/95	Nishizawa et al.	117	86	03/11/1994	
	A53	5,443,647	08/22/95	Aucoin et al.	118	723 ME	07/11/1994	
✓	A54	5,455,072	10/03/95	Bension et al.	427	255.7	11/18/1992	
Foreign Patent Documents								
*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
W	B13	00/54320 A1	09/14/2000	WO	H01L	21/44	—	X
	B14	00/16377 A2	03/23/2000	WO	H01L	---	—	X
	B15	00/15881 A2	03/23/2000	WO	C30B	---	—	X
✓	B16	00/15865 A1	03/23/2000	WO	C23C	16/00	—	X
OTHER ART								
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.						
W	C7	Niinisto, et al., "Synthesis of oxide thin films and overlayers by atomic layer epitaxy for advanced applications", <i>Mat. Sci. &amp; Eng.</i> , Vol. B41 (1996), pp. 23-29.						
Examiner <i>Chore</i>					Date Considered <i>3/9/05</i>			
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Examiner Unknown					Filing Date December 21, 2001		Group Unknown	

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U.S. Patent Documents							
*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate
W	A55	5,458,084	10/17/95	Thorne et al.	117	89	12/09/1993
	A56	5,469,806	11/28/95	Mochizuki et al.	117	97	08/20/1993
	A57	5,480,818	01/02/96	Matsumoto et al.	437	40	02/09/1993
	A58	5,483,919	01/16/96	Yokoyama et al.	117	89	08/17/1994
	A59	5,484,664	01/16/96	Kitahara et al.	428	641	01/21/1994
	A60	5,503,875	04/02/96	Imai et al.	427	255.3	03/17/1994
	A61	5,521,126	05/28/96	Okamura et al.	437	235	06/22/1994
	A62	5,527,733	06/18/96	Nishizawa et al.	437	160	02/18/1994
	A63	5,532,511	07/02/96	Nishizawa et al.	257	627	03/23/1995
	A64	5,540,783	07/30/96	Eres et al.	118	725	05/26/1994
	A65	5,601,651	02/11/97	Watabe	118	715	12/14/1994
	A66	5,616,181	04/01/97	Yamamoto et al.	118	723 ER	11/21/1995
✓	A67	5,637,530	06/10/97	Gaines et al.	114	105	06/10/1996

Foreign Patent Documents								
*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
W	B17	99/41423 A2	08/19/1999	WO	C23C	---	---	X
	B18	99/29924 A1	06/17/1999	WO	C23C	16/04	---	X
	B19	99/01595	01/14/1999	WO	C30B	25/14	---	X
✓	B20	96/18756 A1	06/20/1996	WO	C23C	16/08	---	X

OTHER ART		
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
W	C8	Ritala, et al., "Perfectly conformal TiN and Al <sub>2</sub> O <sub>3</sub> films deposited by atomic layer deposition", <i>Chemical Vapor Deposition</i> , Vol. 5(1) (January 1999), pp. 7-9.
W	C9	Klaus, et al., "Atomically controlled growth of tungsten and tungsten nitride using sequential surface reactions", <i>Appl. Surf. Sci.</i> , Vol 162-163 (2000), pp. 479-491.
Examiner	KAPLA MOORE	
		Date Considered 3/9/05

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Examiner Unknown								
U.S. Patent Documents								
*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate	
W	A68	5,641,984	06/24/97	Aftergut et al.	257	433	08/19/1994	
	A69	5,644,128	07/01/97	Wollnik et al.	250	251	08/25/1994	
	A70	5,693,139	12/02/97	Nishizawa et al.	117	89	06/15/1993	
	A71	5,705,224	01/06/98	Murota et al.	427	248.1	01/31/1995	
	A72	5,707,880	01/13/98	Aftergut et al.	437	3	01/17/1997	
	A73	5,711,811	01/27/98	Suntola et al.	118	711	11/28/1995	
	A74	5,730,802	03/24/98	Ishizumi et al.	118	719	12/27/1996	
	A75	5,747,113	05/05/98	Tsai	427	255.5	07/29/1996	
	A76	5,749,974	05/12/98	Habuka et al.	118	725	07/13/1995	
	A77	5,796,116	08/18/98	Nakata et al.	257	66	07/25/1995	
	A78	5,807,792	09/15/98	Ilg et al.	438	758	12/18/1996	
	A79	5,830,270	11/03/98	McKee et al.	117	106	08/05/1996	
W	A80	5,835,677	11/10/98	Li et al.	392	401	10/03/1996	
Foreign Patent Documents								
*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
W	B21	96/17107 A1	06/06/1996	WO	C23C	16/44	—	X
	B22	93/02111 A1	02/04/1993	WO	C08F	4/78	—	X
	B23	91/10510 A1	07/25/1991	WO	B01J	37/02	—	X
W	B24	0 799 641 A2	10/08/1997	EP	B01J	20/32	—	X
OTHER ART								
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.						
W	C10	Min, et al., "Atomic layer deposition of TiN thin films by sequential introduction of Ti precursor and NH/sub3/", <i>Symp.: Advanced Interconnects and Contact Materials and Processes for Future Integrated Circuits</i> (Apr. 13-16, 1998), pp. 337-342.						
Examiner KAPLA MOORE					Date Considered 3/9/05			
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U.S. Patent Documents							
*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate
ku	A81	5,851,849	12/22/98	Comizzoli et al.	438	38	05/22/1997
	A82	5,855,675	01/05/99	Doering et al.	118	719	03/03/1997
	A83	5,855,680	01/05/99	Soininen et al.	118	719	11/28/1995
	A84	5,858,102	01/12/99	Tsai	118	719	02/14/1998
	A85	5,879,459	03/09/99	Gadgil et al.	118	715	08/29/1997
	A86	5,904,565	05/18/1999	Nguyen, et al.	438	687	07/17/1997
	A87	5,916,365	06/29/99	Sherman	117	92	08/16/1996
	A88	5,923,056	07/13/99	Lee et al.	257	192	03/12/1998
	A89	5,923,985	07/13/99	Aoki et al.	438	301	01/14/1997
	A90	5,925,574	07/20/99	Aoki et al.	437	31	04/10/1992
	A91	5,942,040	08/24/99	Kim et al.	118	726	08/27/1997
	A92	5,947,710	09/07/1999	Cooper, et al.	418	63	06/16/1997
↓	A93	5,972,430	10/26/99	DiMeo, Jr. et al.	427	255.32	11/26/1997

Foreign Patent Documents								
*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
ku	B25	0 442 490 A1	08/21/1991	EP	C30B	25/02	—	X
↓	B26	0 344 352 A1	12/06/1989	EP	H01L	39/24	—	X
↓	B27	62-091495 A	04/25/1987	JP	C30B	25/02	—	X

OTHER ART		
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
ku	C11	Klaus, et al., "Atomic Layer Deposition of Tungsten using Sequential Surface Chemistry with a Sacrificial Stripping Reaction," Thin Solid Films 360 (2000), Pages 145 – 153, (Accepted Nov. 16, 1999).
ku	C12	Min, et al., "Metal-Organic Atomic-Layer Deposition of Titanium-Silicon-Nitride Films", Applied Physics Letters, American Inst. Of Physics, Vol 75(11) (Sept. 13, 1999).
Examiner	KAPLA MOORE	
	Date Considered	3/9/05

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U.S. Patent Documents							
*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate
W	A94	6,001,669	12/14/99	Gaines et al.	438	102	07/21/1992
	A95	6,015,590	01/18/00	Suntola et al.	427	255.23	11/28/1995
	A96	6,025,627	02/15/00	Forbes et al.	257	321	05/29/1998
	A97	6,036,773	03/14/00	Wang et al.	117	97	03/27/1997
	A98	6,042,652	03/28/00	Hyun et al.	118	719	09/07/1999
	A99	6,043,177	03/28/00	Falconer et al.	502	4	01/21/1997
	A100	6,124,158	09/26/00	Dautartas et al.	438	216	06/08/1999
	A101	6,113,977	09/05/00	Soininen et al.	427	64	09/11/1997
	A102	6,130,147	10/10/00	Major et al.	438	604	03/18/1997
	A103	6,139,700	10/31/00	Kang et al.	204	192.17	09/30/1998
	A104	6,174,377	01/16/2001	Doering, et al.	118	729	01/04/1999
↓	A105	6,174,809	01/16/2001	Kang, et al.	438	682	12/15/1998

Foreign Patent Documents								
*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
W	B28	60-065712 A	04/15/1985	JP	C01B	33/113	—	X
	B29	03-048421	03/01/1991	JP	H01L	21/302	—	X
↓	B30	03-286531	12/17/1991	JP	H01L	21/316	—	X

OTHER ART		
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
W	C13	Martensson, et al., "Atomic Layer Epitaxy of Copper on Tantalum", <i>Chemical Vapor Deposition</i> , 3(1) (Feb. 1, 1997), pp. 45-50.
	C14	Ritala, et al. "Atomic Layer Epitaxy Growth of TiN Thin Films", <i>J. Electrochem. Soc.</i> , 142(8) (Aug. 1995), pp. 2731-737.
↓	C15	Elers, et al., "NbC15 as a precursor in atomic layer epitaxy", <i>Appl. Surf. Sci.</i> , Vol. 82/83 (1994), pp. 468-474.

Examiner	KAPLA MODRE	Date Considered	3/9/05
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Examiner Unknown								
U.S. Patent Documents								
*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date (Appropriate)	
W	A106	6,200,893	03/13/2001	Sneh	438	685	03/11/1998	
	A107	6,203,613	03/20/2001	Gates, et al.	117	104	10/19/1999	
	A108	6,207,302	03/27/2001	Sugiura, et al.	428	690	03/02/1998	
	A109	6,248,605	06/19/2001	Harkonen, et al.	438	29	06/02/1999	
	A110	6,270,572	08/07/2001	Kim, et al.	117	93	08/09/1999	
	A111	6,287,965	09/11/2001	Kang, et al.	438	648	02/23/2000	
	A112	6,291,876	09/18/2001	Stumborg, et al.	257	632	08/20/1998	
	A113	6,305,314	10/23/2001	Sneh, et al.	118	723 R	12/17/1999	
	A114	6,306,216	10/23/2001	Kim, et al.	118	725	07/12/2000	
	A115	6,316,098	11/13/2001	Yitzchaik, et al.	428	339	03/23/1999	
	A116	2001/0000866	05/10/2001	Sneh, et al.	118	723 R	11/29/2000	
✓	A117	2001/0009140	07/26/2001	Bondestam, et al.	118	725	01/25/2001	
Foreign Patent Documents								
*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
W	B31	04-031396 A	02/03/1992	JP	C30B	25/14	—	X
	B32	06-291048	10/18/1994	JP	H01L	21/205	—	X
	B33	08-264530	10/11/1996	JP	H01L	21/3205	—	X
✓	B34	11-269652	10/05/1999	JP	C23C	16/44	—	X
OTHER ART								
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.						
W	C16	Lee, "The Preparation of Titanium-Based Thin Film by CVD Using Titanium Chlorides as Precursors", <i>Chemical Vapor Deposition</i> , 5(2) (Mar. 1999), pp. 69-73.						
W	C17	Martensson, et al., "Atomic Layer Epitaxy of Copper, Growth & Selectivity in the Cu (II)-2,2,6,6-Tetramethyl-3, 5-Heptanedion ATE/H <sub>2</sub> Process", <i>J. Electrochem. Soc.</i> , 145(8) (Aug. 1998), pp. 2926-2931.						
Examiner KAPLA MOORE					Date Considered 3/9/05			
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U.S. Patent Documents							
*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate
me	A118	2001/0011526	08/09/2001	Doering, et al.	118	729	01/16/2001
me	A119	2001/0031562	10/18/2001	Raaijmakers, et al.	438	770	02/22/2001
	A120	2001/0034123	10/25/2001	Jeon, et al.	438	643	04/06/2001
	A121						
	A122						
	A123						

Foreign Patent Documents								
*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
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me	B35	2001-62244	03/13/2001	JP	B01D	53/34	—	X
	B36	198 20 147	07/01/1999	DE	H01L	21/3205	—	X
	B37	196 27 017	01/09/1997	DE	H01L	21/283	—	X
	B38	2 626 110	07/21/1989	FR	H01L	39/24	—	X
	B39	2 692 597	12/24/1993	FR	C23C	16/00	—	X
✓	B40	2 355 727A	05/02/2001	GB	C23C	16/44	—	X

OTHER ART		
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
me	C18	Min, et al., "Chemical Vapor Deposition of Ti-Si-N Films with Alternating Source Supply", <i>Mat., Res. Soc. Symp. Proc.</i> , Vol. 564 (Apr. 5, 1999), pp. 207-210
	C19	Bedair, "Atomic layer epitaxy deposition processes", <i>J. Vac. Sci. Technol.</i> 12(1) (Jan/Feb 1994)
	C20	Yamaga, et al., "Atomic layer epitaxy of ZnS by a new gas supplying system in a low-pressure metalorganic vapor phase epitaxy", <i>J. of Crystal Growth</i> 117 (1992), pp. 152-155
✓	C21	Elam, et al., "Nucleation and growth during tungsten atomic layer deposition on SiO <sub>2</sub> surfaces," <i>Thin Solid Films</i> 386 (2001) Pages 41 – 52, (Accepted Dec. 14, 2000).

Examiner	LAPLA MOPE	Date Considered	3/9/05
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## INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet

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of

1

Application Number

10/032,284

Filing Date

December 21, 2001

First Named Inventor

Ling Chen et al.

Group Art Unit

1763

Examiner Name

Moore, Karla A.

Attorney Docket Number

AMAT/5192.02/CPI/COPPER/PJS

Submission Date

March 31, 2004

### U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
	A1	US-3,291,456	12-13-1966	Deane	
	A2	US-4,761,269	08-02-1988	Conger et al.	
	A3	US-6,302,965 B1	10-16-2001	Umotoy et al.	
	A4	US-2003/0019428 A1	01-30-2003	Ku et al.	
	A5	US-			
	A6	US-			
	A7	US-			
	A8	US-			
	A9	US-			
	A10	US-			
	A11	US-			
	A12	US-			
	A13	US-			
	A14	US-			
	A15	US-			
	A16	US-			
	A17	US-			
	A18	US-			

### FOREIGN PATENT DOCUMENTS

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		Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known)				
	B1					
	B2					
	B3					
	B4					
	B5					

Examiner

KAPLA MOORE

Date Considered

3/9/05

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. <sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 801.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

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(Use as many sheets as necessary)

Application Number	10/032,284
Filing Date	December 21, 2001
First Named Inventor	Ling Chen et al.
Group Art Unit	1763
Examiner Name	Karla A. Moore
Attorney Docket Number	APPM/5192.02/CPI/COPPER/PJS
Submission Date	April 23, 2004

Sheet 1 of 9

## U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
Kue	A1	US-4,058,430	11-15-1977	Suntola et al.	
	A2	US-4,389,973	06-28-1983	Suntola et al.	
	A3	US-4,413,022	11-01-1983	Suntola et al.	
	A4	US-4,834,831	05-30-1989	Nishizawa et al.	
	A5	US-4,975,252	12-04-1990	Nishizawa et al.	
	A6	US-4,993,357	02-19-1991	Scholz	
	A7	US-5,225,366	07-06-1993	Yoder	
	A8	US-5,281,274	01-25-1994	Yoder	
	A9	US-5,281,485	01-25-1994	Colgan et al.	
	A10	US-5,294,286	03-15-1994	Nishizawa et al.	
	A11	US-5,306,666	04-26-1994	Izumi	
	A12	US-5,374,570	12-20-1994	Nasu et al.	
	A13	US-5,441,703	08-15-1995	Jurgensen	
	A14	US-5,443,647	08-22-1995	Aucoin et al.	
	A15	US-5,480,818	01-02-1996	Matsumoto et al.	
	A16	US-5,483,919	01-16-1996	Yokoyama et al.	
	A17	US-5,503,875	04-02-1996	Imai et al.	
	A18	US-5,711,811	01-27-1998	Suntola et al.	

## FOREIGN PATENT DOCUMENTS

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		Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known)				
Kue	B1	GB 2 355 727 A	05-02-2001	Kim et al.		
	B2	JP 08-264530 (Abstract)	10-11-1996	Haruhito et al.		
	B3	JP 2000-212752	11-12-2002	Chae et al.		X
	B4	JP 2001-172767	06-26-2001	Mikko et al.		X
	B5	JP 2001-328900	11-27-2001	Akinosuke		X

Date Considered

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# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Application Number	10/032,284
Filing Date	December 21, 2001
First Named Inventor	Ling Chen et al.
Group Art Unit	1763
Examiner Name	Karla A. Moore
Attorney Docket Number	APPM/5192.02/CPI/COPPER/PJS
Submission Date	April 23, 2004

Sheet 2 of 9

## **U.S. PATENT DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
W	A19	US-5,730,802	03-24-1998	Ishizumi, et al.	
	A20	US-5,804,488	09-08-1998	Shih et al.	
	A21	US-5,807,792	09-15-1998	Ilg, et al.	
	A22	US-5,838,677	11-17-1998	Kozaki et al.	
	A23	US-5,855,680	01-05-1999	Soininen et al.	
	A24	US-5,879,459	03-09-1999	Gadgii, et al.	
	A25	US-5,916,365	06-29-1999	Sherman	
	A26	US-5,923,056	07-13-1999	Lee, et al.	
	A27	US-6,015,590	01-18-2000	Suntola et al.	
	A28	US-6,015,917	01-18-2000	Bhandari et al.	
	A29	US-6,042,652	03-28-2000	Hyun et al.	
	A30	US-6,066,358	05-23-2000	Guo et al.	
	A31	US-6,124,158	09-26-2000	Dautartas, et al.	
	A32	US-6,139,700	10-31-2000	Kang et al.	
	A33	US-6,174,377 B1	01-16-2001	Doering, et al.	
	A34	US-6,174,809 B1	01-16-2001	Kang, et al.	
V	A35	US-6,200,893 B1	03-13-2001	Sneh	
	A36	US-6,203,613 B1	03-20-2001	Gates et al.	

## **FOREIGN PATENT DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T <sup>6</sup>
		Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known)				
W	B6	WO 00-16377	03-23-2000	Yi et al.		
	B7	WO 01-17692 A1	03-15-2001	Raaijmakers		
	B8	WO 01-27346 A1	04-19-2001	Elers		
	B9	WO 01-27347 A1	04-19-2001	Elers		
	B10	WO 01-29280 A1	04-26-2001	Elers et al.		

Examiner

KARLA MOORE

Date Considered

5/9/05

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# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 3

of 9

Application Number	10/032,284
Filing Date	December 21, 2001
First Named Inventor	Ling Chen et al.
Group Art Unit	1763
Examiner Name	Karla A. Moore
Attorney Docket Number	APPM/5192.02/CPI/COPPER/PJS
Submission Date	April 23, 2004

## U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
ku	A37	US-6,207,487 B1	03-27-2001	Kim et al.	
	A38	US-6,218,298 B1	04-17-2001	Hoinkis	
	A39	US-6,284,646 B1	09-04-2001	Leem	
	A40	US-6,287,965 B1	09-11-2001	Kang, et al.	
	A41	US-6,305,314 B1	10-23-2001	Sneh et al.	
	A42	US-6,306,216 B1	10-23-2001	Kim, et al.	
	A43	US-6,333,260 B1	12-25-2001	Kwon, et al.	
	A44	US-6,335,280 B1	01-01-2002	Van der Jeugd	
	A45	US-6,342,277 B1	01-29-2002	Sherman	
	A46	US-6,348,376 B2	02-19-2002	Lim et al.	
	A47	US-6,355,561 B1	03-12-2002	Sandhu, et al.	
	A48	US-6,358,829 B2	03-19-2002	Yoon, et al.	
	A49	US-6,368,954 B1	04-09-2002	Lopatin, et al.	
	A50	US-6,369,430 B1	04-09-2002	Adetutu, et al.	
	A51	US-6,372,598 B2	04-16-2002	Kang et al.	
V	A52	US-6,379,748 B1	04-30-2002	Bhandari et al.	
	A53	US-6,391,785 B1	05-21-2002	Satta et al.	
	A54	US-6,399,491 B2	06-04-2002	Jeon et al.	

## FOREIGN PATENT DOCUMENTS

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		Country Code <sup>2</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known)				
ku	B11	WO 01-29893A1	04-26-2001	Elers et al.		
	B12	WO 01-66832 A2	09-13-2001	Werkhoven et al.		
	B13	WO 02-01628 A2	01-03-2002	Byun et al.		
	B14	WO 02-067319 A2	08-29-2002	Kim et al.		
	B15	WO 02-08485 A2	01-31-2002	Van Wijck et al.		

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Sheet

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of

9

Application Number

10/032,284

Filing Date

December 21, 2001

First Named Inventor

Ling Chen et al.

Group Art Unit

1763

Examiner Name

Karla A. Moore

Attorney Docket Number

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		Number-Kind Code <sup>2</sup> (if known)			
[Signature]	A55	US-6,416,577 B1	07-09-2002	Suntolaa et al.	<div></div>
	A56	US-6,416,822 B1	07-09-2002	Chiang et al.	
	A57	US-6,420,189 B1	07-16-2002	Lopatin	
	A58	US-6,423,619 B1	07-23-2002	Grant, et al.	
	A59	US-6,428,859 B1	08-06-2002	Chiang et al.	
	A60	US-6,447,933 B1	09-10-2002	Wang, et al.	
	A61	US-6,451,119 B2	09-17-2002	Sneh et al.	
	A62	US-6,451,695 B2	09-17-2002	Sneh	
	A63	US-6,468,924 B2	10-22-2002	Lee et al.	
	A64	US-6,475,276 B1	11-05-2002	Elers et al.	
	A65	US-6,475,910 B1	11-05-2002	Sneh	
	A66	US-6,482,262 B1	11-19-2002	Elers et al.	
	A67	US-6,482,733 B2	11-19-2002	Raaijmakers, et al.	
	A68	US-6,482,740 B2	11-19-2002	Soininen, et al.	
	A69	US-6,534,395 B2	03-18-2003	Werkhoven et al	
	A70	US-6,551,929 B1	04-22-2003	Kori et al.	
	A71	US-6,575,705 B2	06-10-2003	Akiyama et al.	
	A72	US-6,585,823 B1	07-01-2003	Van Wijck	

A73

## FOREIGN PATENT DOCUMENTS

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		Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known)				
[Signature]	B16	WO 02-43115 A2	05-30-2002	Pomarede et al.	<div></div>	
	B17	WO 02-45167 A2	06-06-2002	Hujanen et al.		
	B18					
	B19					
	B20					

Examiner

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Date Considered

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Filing Date	December 21, 2001
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Group Art Unit	1763
Examiner Name	Karla A. Moore
Attorney Docket Number	APPM/5192.02/CPI/COPPER/PJS
Submission Date	April 23, 2004

5 of 9

## U.S. PATENT DOCUMENTS

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		Number-Kind Code <sup>2</sup> (if known)			
VU	A73	US-6,599,572 B2	07-29-2003	Saanila et al.	
	A74	US-6,607,976 B2	08-19-2003	Chen et al.	
	A75	US-6,632,279 B1	10-14-2003	Ritala et al.	
	A76	US-6,686,271 B2	02-03-2004	Raaijmakers et al.	
	A77	US-2001-0000866 A1	05-10-2001	Sneh et al.	
	A78	US-2001-0002280 A1	05-31-2001	Sneh	
	A79	US-2001-0009140 A1	07-26-2001	Bondestam et al.	
	A80	US-2001-0009695 A1	07-26-2001	Saanila, et al.	
	A81	US-2001-0011526 A1	08-09-2001	Doering, et al.	
	A82	US-2001-0024387 A1	09-27-2001	Raaijmakers et al.	
	A83	US-2001-0025979 A1	10-04-2001	Kim et al.	
	A84	US-2001-0028924 A1	10-11-2001	Sherman	
	A85	US-2001-0029094 A1	10-11-2001	Mee-Young, et al.	
	A86	US-2001-0034123 A1	10-25-2001	Jeon et al.	
	A87	US-2001-0054730 A1	12-27-2001	Kim et al.	
	A88	US-2001-0054769 A1	12-27-2001	Raaijmakers et al.	
	A89	US-2002-0000598 A1	01-03-2002	Kang et al.	
	A90	US-2002-0004293 A1	01-10-2002	Soininen, et al.	

## FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T <sup>6</sup>
		Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known)				
	B21					
	B22					
	B23					
	B24					
	B25					

Examiner

KARLA MOORE

Date Considered

3/9/05

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**INFORMATION DISCLOSURE  
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Sheet 6

of

9

Application Number

10/032,284

Filing Date

December 21, 2001

First Named Inventor

Ling Chen et al.

Group Art Unit

1763

Examiner Name

Karla A. Moore

Attorney Docket Number

APPM/5192.02/CPI/COPPER/PJS

Submission Date

April 23, 2004

**U.S. PATENT DOCUMENTS**

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		Number-Kind Code <sup>2</sup> (if known)			
K	A91	US-2002-0019121 A1	02-14-2002	Pyo	
	A92	US-2002-0020869 A1	02-21-2002	Park et al.	
	A93	US-2002-0021544 A1	02-21-2002	Cho et al.	
	A94	US-2002-0031618 A1	03-14-2002	Sherman	
	A95	US-2002-0037630 A1	03-28-2002	Agarwal, et al.	
	A96	US-2002-0048635 A1	04-25-2002	Kim et al.	
	A97	US-2002-0048880 A1	04-25-2002	Lee	
	A98	US-2002-0055235 A1	05-09-2002	Agarwal, et al.	
	A99	US-2002-0061612 A1	05-23-2002	Sandhu, et al.	
	A100	US-2002-0068458 A1	06-06-2002	Chiang et al.	
	A101	US-2002-0076837 A1	06-20-2002	Hujanen et al.	
	A102	US-2002-0086111 A1	07-04-2002	Byun et al.	
	A103	US-2002-0090829 A1	07-11-2002	Sandhu, et al.	
	A104	US-2002-0105088 A1	08-08-2002	Yang, et al.	
	A105	US-2002-0106536 A1	08-08-2002	Lee et al.	
	A106	US-2002-0106846 A1	08-08-2002	Seutter, et al.	
	A107	US-2002-0109168 A1	08-15-2002	Kim, et al.	
	A108	US-2002-0155722 A1	10-24-2002	Satta et al.	

**FOREIGN PATENT DOCUMENTS**

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K	B26					
	B27					
	B28					
	B29					
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KARLA MOORE

Date Considered

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**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

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Sheet 7

of 9

Application Number

10/032,284

Filing Date

December 21, 2001

First Named Inventor

Ling Chen et al.

Group Art Unit

1763

Examiner Name

Karla A. Moore

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Submission Date

April 23, 2004

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KLM	A109	US-2002-0162506 A1	11-07-2002	Sneh et al.	
	A110	US-2003-0072975 A1	04-17-2003	Shero et al.	
	A111	US-2003-0082296 A1	05-01-2003	Elers et al.	
	A112	US-2003-0104126 A1	06-05-2003	Fang et al.	
	A113	US-2003-0129826 A1	07-10-2003	Werkhoven et al.	
	A114	US-2003-0134508 A1	07-17-2003	Raaijmakers et al.	
	A115	US-2003-0143839 A1	07-31-2003	Raaijmakers et al.	
	A116	US-2003-0168750 A1	09-11-2003	Basceri et al.	
	A117	US-2003-0173586 A1	09-18-2003	Moriwaki et al.	
	A118	US-2003-0186495 A1	10-02-2003	Saanila et al.	
	A119	US-2003-0205729 A1	11-06-2003	Basceri et al.	
	A120	US-			
	A121	US-			
	A122	US-			
	A123	US-			
	A124	US-			
	A125	US-			
	A126	US-			

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	B31					
	B32					
	B33					
	B34					
	B35					

Examiner

LAPLA MOORE

Date Considered

3/9/05

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Sheet

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9

Application Number

10/032,284

Filing Date

December 21, 2001

First Named Inventor

Ling Chen et al.

Group Art Unit

1763

Examiner Name

Karla A. Moore

Attorney Docket Number

APPM/5192.02/CPI/COPPER/PJS

Submission Date

April 23, 2004

## **NON PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
<i>Ku</i>	1	Kukli, et al. "Properties of {Nb <sub>1-x</sub> Ta <sub>x</sub> } <sub>2</sub> O <sub>5</sub> Solid Solutions and {Nb <sub>1-x</sub> Ta <sub>x</sub> } <sub>2</sub> O <sub>5</sub> -ZrO <sub>2</sub> Nanolaminates Grown by Atomic Layer Epitaxy," NanoStructured Materials, Vol. 8, No. 7, 1997, p. 785-93	—
	2	Kukli, et al., "In-situ Study of Atomic Layer Epitaxy Growth of Tantalum Oxide Thin Films from Ta(OC <sub>2</sub> H <sub>5</sub> ) <sub>5</sub> and H <sub>2</sub> O," Applied Surface Science, March 1997, p. 236-42	—
	3	Kukli, et al. "Properties of Ta <sub>2</sub> O <sub>3</sub> based Dielectric Nanolaminates Deposited by Atomic Layer Epitaxy," J. Electrochem. Soc., Vol. 144, No. 1 January 1997, p. 300-306	—
	4	Kukli, et al. "Tailoring the Dielectric Properties of HfO <sub>2</sub> -Ta <sub>2</sub> O <sub>5</sub> Nanolaminates," Appl. Phys. Lett. 68 (26), June 24, 1996, p. 3737-3739	—
	5	Kukli, et al. "Atomic Layer Epitaxy Growth of Tantalum Oxide Thin Films from Ta(OC <sub>2</sub> H <sub>5</sub> ) <sub>5</sub> and H <sub>2</sub> O," J. Electrochem. Soc., Vol. 142, No. 5, May 1995 p. 1670-1675	—
	6	Ritala, M., et al. "Controlled growth of TaN, Ta <sub>3</sub> N <sub>5</sub> , and TaO <sub>x</sub> N <sub>y</sub> thin films by atomic layer deposition," Chem. Mater., Vol. 11, No. 7, 1999 pp. 1712-1718	—
	7	Leskela, M., et al. "Atomic layer epitaxy in deposition of various oxide and nitride thin films," Colloque C5, supplement au Journal de Physique II, Volume 5, June 1995 pp.937-951	—
	8	Hiltunen, L., et al. "Nitrides of titanium, niobium, tantalum and molybdenum grown as thin films by the atomic layer epitaxy method," Thin Solid Films, 166 (1988) 149-154	—
	9	KLAUS, ET AL. "Atomically Controlled Growth of Tungsten Nitride Using Sequential Surface Reactions," Applied Surface Science, 162-163 (2000) 479-491.	—
	10	YANG, ET AL. "Atomic Layer Deposition of Tungsten Film from WF <sub>6</sub> /B <sub>2</sub> H <sub>6</sub> : Nucleation Layer for Advanced Semiconductor Device," Conference Proceedings ULSI XVII (2002).	—
<i>V</i>	11	NIINISTO, ET AL. "Synthesis of Oxide Thin Films and Overlayers by Atomic Layer Epitaxy for Advanced Applications," Materials Science and Engineering B41 1996 p. 23-29.	—

Examiner

KARLA MOORE

Date Considered

3/9/05

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**Application Number**

**10/032,284**

**Filing Date**

**December 21, 2001**

First Named Inventor

Ling Chen et al.

### Group Art Unit

1763

Examiner Name

**Karla A. Moore**

Attorney Docket Number

APPM/5192.02/CP/COPPER/PJS

**Submission Date**

**April 23, 2004**

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Sheet 9

of 9

9

**Submission Date**

**April 23, 2004**

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**Date Considered**

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Sheet 11

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Application Number

10/032,284

Filing Date

December 21, 2001

First Named Inventor

Ling Chen et al.

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KLM	A1	US-5,796,116	08-18-1998	Nakata et al.	
	A2	US-2002-0098627 A1	07-25-2002	Pomarede et al.	
	A3	US-			
	A4	US-			
	A5	US-			
	A6	US-			
	A7	US-			
	A8	US-			
	A9	US-			
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	A16	US-			
	A17	US-			
	A18	US-			

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		Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known)				
KLM	B1	WO 99/29924	06-17-1999	Suntola et al.		
	B2	WO 01/12891 A1	02-22-2001	Park		
	B3					
	B4					
	B5					

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